

What is claimed

1. An electrochemical lead-acid battery having an electrolyte containing an organic polymer and an ultra fine lignin having a particle size between about 0.01 and about 0.8 micron.

2. The electrochemical lead-acid battery of claim 1 wherein the ultra fine lignin has a particle size between about 0.1 and about 0.6 micron.

3. The electrochemical lead-acid battery of claim 1 wherein the organic polymer is at least one organic polymer selected from the group comprising polycrylic acid or its copolymers, polyvinyl alcohol and ethylene glycol.

4. The electrochemical lead-acid battery of claim 1 wherein the electrolyte contains at least one additional additive selected from the group of materials consisting essentially of silicone compounds, indium, tin, lead sulfate, barium sulfate and mixtures thereof.

5. The electrochemical lead-acid battery of claim 4 wherein the electrolytes contains an antimony as an impurity.

6. The electrochemical lead-acid battery of claim 1 wherein the polymer is present in an aqueous solution wherein the polymer is between about 0.1% and 13% in water.

7. The electrochemical lead-acid battery of claim 6 wherein the organic polymer is polyvinyl alcohol.

8. The electrochemical lead-acid battery of claim 2 wherein the electrolyte contains at least one additional additive selected from the group of materials consisting essentially of indium, tin, lead sulfate, barium sulfate, and mixtures thereof.

9. The electrochemical lead-acid battery having an electrolyte containing at least one organic polymer selected from the group consisting of polycrylic acid or its copolymers, polyvinyl alcohol and ethylene glycol and wherein the polymer is present in an amount between about 0.1% and about 13% in water.

10. The electrochemical lead-acid battery of claim 9 wherein the electrolyte contains at least one additional additive selected from the group of materials consisting essentially of indium, tin, lead sulfate, barium sulfate and mixtures thereof.

11. The electrochemical lead-acid battery of claim 10 wherein said additional additive is present in an amount between about 0.01% and about 0.1% per 12-Volt 50-Ampere battery.

12. The electrochemical lead-acid battery of claim 10 wherein the additional additive is lead sulfate or barium sulfate.

13. The electrochemical lead-acid battery of claim 10 wherein the additional additive is indium.

14. A process of charging a lead-acid battery containing an electrolyte and active components comprising the steps:

a) adding to the electrolyte of the battery at least one organic polymer; and

b) discharging the battery at a high current rate of at least 0.3C for at least five minutes.

15. The process of claim 14 wherein step a) at least one additional additive selected from the group of materials consisting essentially of indium, tin, lead sulfate, barium sulfate and mixtures thereof is added to the electrolyte.

16. The process of claim 14 wherein for deteriorated battery before step b) charging the battery at low current for a period of time for the battery to have sufficient power to perform the process step b).

17. The process of claim 14 wherein after step b) step c) is added charging at a high current rate of at least 1.5C.

18. The process of claim 14 wherein an ultra fine lignin is added to the electrolyte of step a).

19. The process of claim 17 wherein the discharging and charging is repeated more than twice providing a plurality of cycles.

20. The process of claim 19 wherein the additives are added to the electrolyte along with active components before the initial discharging of the battery.